GRAYBACK THINNING KV PROJECT

ROAD REHABILITATION AND SEDIMENT CONTROL

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Background

Thinning and fuels reduction activities were completed in a managed stand located on a northeast slope in the Little Creek/Grayback Creek area. The stand is at roughly 4000 feet of elevation within the transient snow zone. The KV project was intended to remedy overland flow/sediment generation from roads/trails utilized for harvest.

Roads and trails were treated utilizing a tracked excavator equipped with a specialized clamshell bucket developed on the Umpqua National Forest. Roads were subsoiled with twin shanks fitted to the bucket; loose slash and displaced soil from the surrounding area was then placed on top by the same machine on the same pass. Work was performed to avoid machine passage over treated areas.

Excavator with specialized bucket fitted with two shanks for breaking up compacted soils.

Observations

The harvest unit was densely roaded including haul routes and skid trails from historic tractor harvest. Thinning, fireline construction, and burning had increased surface flow on compacted surfaces by removing canopy and ground cover. Sediment from recent storm activity was conspicuous on the steeper slopes, particularly where compacted surfaces had become exposed. The fireline along the unit boundary was often located on an old road/trail and on steep slopes; as such, it was either washed to a hard, impermeable surface or contained fresh sediment deposits. Post harvest/burn activities had left slash distributed over the unit, including on roads; however much of the material was elevated above the soil surface where it would have little sediment trapping or soil stabilizing effect.

View of fireline on old skid trail, located on a slope. Spring rains had washed the fireline clean to the compacted surface of the road.

Unit soils are derived from granitic rocks, tending toward a granular composition with some clay. Undisturbed soil would have a high infiltration rate with moderate water retention (depending on clay content). Decomposed granite material is often used as an inexpensive driveway surfacing since it is relatively light, spreads well (due to gravel and smaller particle size), and compacts smoothly (due to clay content). Compaction on historic haul routes and landings was severe enough to challenge the excavator; on skid trails compaction was more moderate. All of the haul routes, landings, and most of the skid trails were treated over a 3.5 day period. Areas left untreated were on steep slopes. Subsoiling was able to avoid pulling up large roots of adjacent trees, since the operator could feel the presence of the root, lift the shank, and reinitiate the pass. clear

Top: View of landing that had been ripped/scarified by harvest contractor, prior to subsoiling.

Bottom: Landing after subsoiling. Stump marked with arrow for reference. Note the incorporation of organic matter and greater “fluff” of the surface.

Top: Road to landing prior to treatment.

Bottom: Road to landing after treatment. Note log across road in foreground for reference.


Left:: Uncompacted soil located adjacent to a haul road, exposed by the subsoiling head. Pen is six inches long.
Right: Subsoiling in compacted soil within road travelway. Note chunky texture of material. These two photographs were taken with a few feet of each other, and demonstrate the severity of compaction in the travelway compared with untraveled areas.

Close-up view of block of severely compacted material brought up by subsoiler along a main haul route.

Conclusions

The Grayback Thin occurred in a unit with heavy ingrowth of 6" and smaller trees. Historic harvest had been accomplished by tractor logging, leaving much of the area severely to moderately compacted. Harvest/thinning/burning operations left the unit with increased compaction and soil disturbance, but with a manageable fuel load and better growing conditions for the remaining trees.

Subsoiling operations were originally prescribed for major haul routes to alleviate sediment generation observed after winter and spring storms. With an experienced operator and the subsoiling head on the excavator, treatment of most of the unit landings, roads and trails was accomplished. Monitoring next spring will demonstrate the effectiveness of the treatment; however, I would expect to see little, if any, overland flow resulting from unit travelways. Due to the reduction of compaction and placement of slash, I would expect revegetation of the disturbed areas to occur very rapidly, and, without the "pygmy tree" development that characterizes compacted soil.

Future use of an excavator with a subsoiling head should consider the following:

- There is a narrow soil moisture window for ideal results. Soils that are too wet will not break up well. Soils that are too dry will offer increased resistance to the excavator (reducing performance), break up in larger pieces, and generate a lot of dust.
- Heavily compacted/rocky soils may do as well with a single shank and improve machine performance.
- Treatment would be much more cost effective if carried out by the contractor, immediately upon conclusion of harvest. More slash would be available for incorporation into rehabilitated areas, improving soil condition and reducing material to be burned. In addition, erosion and sediment generation would be treated earlier than if handled through KV projects.

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